

REMARKS

Reconsideration of the subject application are respectfully requested in light of the amendments above and the comments which follow. As correctly noted in the Office Action Summary, claims 1-9 are pending.

CLAIM REJECTIONS UNDER 35 U.S.C. §102

Claims 1-9 stand rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,208,102 to Schulz et al. (hereafter "*Schulz et al.*") or U.S. Patent No. 5,330,853 to Hofmann et al. (hereafter "*Hofmann et al.*") or EP 448 720 to Sumitomo Electric Industries (hereafter "*EP '720*") on the grounds set forth in paragraph 2 of the Official Action. For at least the reasons noted below, this rejection should be withdrawn.

To anticipate a claim, the reference must teach every element of the claim. See MPEP § 2131. For example, "a claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." Verdegaal Bros. v. Union Oil Co. of California, 814 F.2d 628, 631 (Fed. Cir. 1987). Here, the rejections are traversed because each of the cited references does not teach every element of the claim. Specifically, at least the feature "a MAX-phase defined as $M_{n+1}AX_n$ where n is 1, 2 or 3, M is one of the elements Ti, Zr, Hf, V, Nb, Ta, Cr or Mo, A is Al, Si or S, and X is C, N and/or B" is not disclosed in the cited references. The following comments on each of the references are offered.

Schultz et al. discloses a coated tool having a coating of a first metal, a second metal with a concentration change at least once continuously over the layer

thickness of the coating, nitrogen, carbon, and oxygen (see column 1, lines 39-44). The disclosure indicates that the relationship between the first metal (Me^1) and the second metal (Me^n) is governed by the stoichiometric relationship of $1-x$ to x , respectively (column 1, lines 40-41). Further, *Schultz et al.* discloses that the stoichiometric relationship of nitrogen, carbon, and oxygen sums to unity ($u+v+w=1$) (see, column 1, line 50).

Thus, comparing the disclosure in *Schultz et al.* to the claims of the present application at issue here, it is respectfully noted that the *Schultz et al.* patent does not disclose the claimed relationship of $\text{M}_{n+1}\text{AX}_n$. Indeed, the disclosed relationship in *Schultz et al.*, for the purposes of comparison to the present claims, can be rewritten as $(\text{Me}^1)_{1-x}(\text{Me}^n)_x(\text{Y})_1$, where $\text{Y} = \text{N}_u\text{C}_v\text{O}_w$. Therefore, there is no stoichiometric relationship disclosed in *Schultz et al.* between Me^1 and Y such that the claimed relationship of $\text{M}_{n+1}\text{AX}_n$ is disclosed. Because there is no disclosure or suggestion to a coating with the claimed stoichiometry, it is respectfully asserted that an anticipatory rejection is improper since *Schultz et al.* does not disclose the invention as claimed.

Hofmann et al. discloses a surface coating for tools. The disclosed surface coating includes a first layer of TiAlN_x and a second thinner layer of TiAlN_y (see, Abstract). Reviewing this disclosure, applicants respectfully note that there is no relationship disclosed between the metal (e.g., Ti) and the nitrogen that is within the claimed ranges of applicants' present claims. Rather, at column 2, lines 62-66, the relationship between Ti and N is either unity (see column 2, line 62) or approximately unity (see column 2, lines 62-66, where example stoichiometries are given of Ti:N of 0.32:0.32 and 0.34:0.29 are given). Further relationships between the Ti and N are

disclosed at column 3, lines 46-55, in which the disclosed ranges of Ti:N are near unity.

Applicants note that an upper limit of the Ti:N ratio in the second layer is 1.3. However, applicants' range of ratios for M to X is from 1.33 to 2 and therefore *Hofmann et al.* does not explicitly disclose applicants' claimed range. Further, the disclosure in *Hofmann et al.* teaches away from increasing the Ti:N ratio such that applicants' claim would be obvious when *Hofmann et al.* teaches preferred ranges of 1.2 and lower (see column 2, lines 48-52), thus teaching away from any modification to increase the ratio.

Thus, comparing the disclosure in *Hofmann et al.* to the claims of the present application at issue here, the *Hofmann et al.* patent does not specifically disclose applicants' claimed composition including the stoichiometric relationships of M to X. In light of at least this difference, applicants respectfully submit an anticipatory rejection is improper since *Hofmann et al.* does not disclose the invention as claimed.

EP '720 discloses a surface-coated hard material for cutting tools or wear resistance tools (see, page 1, line 5). *EP '720* discloses a coating consisting of carbides, nitrides and carbonitrides of $M_{1-x}Al_x$. See page 3, lines 53-54. Tables 2, 4 and 6 disclose examples of coatings based on a metal component (M) of titanium, zirconium, and hafnium. In each instance, the stoichiometric relationship between the metal (e.g., titanium in Table, zirconium in Table 4, and hafnium in Table 6) expressed in a formulaic relationship to the carbide, nitride, and carbonitride is non-existence. In other words, there is no relationship between the metal component and the non-aluminum component of the layer. Rather, the tables indicate that the

metal M and the aluminum Al have a stoichiometric relationship and that the carbon C and nitrogen N have a stoichiometric relationship, but the reference is silent as to a stoichiometric relationship between the metal M and the carbides, nitrides and carbonitrides. Therefore, the disclosure in *EP '720* does not disclose a MAX phase defined as $M_{n+1}AX_n$ where n is 1, 2, or 3 as presently claimed. In light of at least this difference, applicants respectfully submit that an anticipatory rejection is improper since *EP '720* does not disclose the invention as claimed.

Since the remaining claims depend from independent claim 1, the anticipatory rejection of these claims should be withdrawn for at least the same reason as discussed above with respect to claim 1.

CONCLUSION

From the foregoing, further and favorable action in the form of a Notice of Allowance is earnestly solicited. Should the Examiner feel that any issues remain, it is requested that the undersigned be contacted so that any such issues may be adequately addressed and prosecution of the instant application expedited.

Respectfully submitted,

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